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A CYCLICAL MODEL OF MOTIVATIONAL CONSTRUCTS IN WEB-BASED COURSES

Traci Sitzmann, Katherine Ely, Kristina N. Bauer
(Advanced Distributed Learning Co-Laboratory)
Kenneth G. Brown (University of Iowa)
Kurt Kraiger (Colorado State University)

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ROBERT A. WISHER
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14. ABSTRACT

This research investigates antecedents and outcomes of motivation to learn across nine Web-based courses. These results supported a cyclical model of motivational processes across courses in a training curriculum. Trainees' course expectations had a positive effect on motivation to learn, motivation to learn had a positive effect on trainee reactions, and trainee reactions predicted expectations for subsequent courses in the curriculum. In addition, motivation to learn decreased across the nine courses such that the average level of motivation was 0.30 points lower (on a five-point scale) for the ninth than for the first course. These results suggest there is a dynamic interplay among motivational constructs over time, and motivation should be examined from a systems perspective to understand carryover effects across training courses.

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Technical Report

A Cyclical Model of Motivational Constructs in Web-Based Courses

Traci Sitzmann, Katherine Ely, and Kristina N. Bauer
Advanced Distributed Learning Co-Laboratory

Kenneth G. Brown
University of Iowa

Kurt Kraiger
Colorado State University

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Office of the Under Secretary of Defense (Personnel and Readiness)
Readiness and Training Directorate
Advanced Distributed Learning (ADL) Initiative
Washington, DC

FOREWORD

The goal of the Advanced Distributed Learning (ADL) Initiative is to provide the highest quality education and training, tailored to individual needs, delivered cost effectively, and at the right place and right time. Since its inception in 1997, ADL has sought to create interoperability of online learning content through the Sharable Content Object Reference Model (SCORM) and to make quality content accessible from commonly designed content object repositories.

In order to meet the ADL mission, the DoD needs to ensure students are motivated and prepared to learn during Web-based instruction. From a review of the literature, I know that motivation is a key factor in determining the amount that students learn online. This report examines changes in motivational processes across courses in a military training curriculum and serves as a research foundation for understanding motivational processes within a Web-based military training curriculum.

Robert A. Wisher
Director, ADL Initiative

A Cyclical Model of Motivational Constructs in Web-Based Courses

EXECUTIVE SUMMARY

Research Requirement:

This research was undertaken at the request of the Defense Ammunition Center (DAC). DAC offers a Quality Assurance Specialists internship training program to prepare civilian employees to perform ammunition logistics management duties involving the production, transportation, storage, inspection, and disposal of ammunition. The current research was conducted as part of an evaluation of the internship program.

Procedure:

Trainees participated in an occupational training program designed to prepare them for civilian positions in the military. Participants were 103 trainees in four cohorts. The part of the training course analyzed for this research consisted of 9 out of 10 self-paced modules comprising a wide variety of topics including workplace safety protocols, handling hazardous material, and military regulations. Each course included multiple modules. The courses were taught in a blended learning format, which was primarily student-directed, but included brief periods of face-to-face classroom instruction. Trainees were allowed to review the modules in any order and as often as desired. At the conclusion of each module, trainees could answer a series of multiple-choice practice questions and receive feedback on their performance. At the end of each course, an instructor led a review session before the trainees completed the post-test.

Findings:

These results supported a cyclical model of motivational processes across courses in a training curriculum. Trainees' course expectations had a positive effect on motivation to learn, motivation to learn had a positive effect on trainee reactions, and trainee reactions predicted expectations for subsequent courses in the curriculum. In addition, motivation to learn decreased across the nine courses. These findings suggest that there is a dynamic interplay among motivational constructs over time and that motivation should be examined from a systems perspective to understand carryover effects across training courses.

Utilization of Findings:

This research highlights the importance of course reputation. Regardless of the quality of instruction, trainees may not be as motivated if they believe the training program will not be enjoyable or relevant to their jobs. Therefore, it is critical to actively collect trainee reactions in an effort to monitor course reputations. By soliciting feedback from trainees, the military can better understand which material trainees found useful and difficulties they encountered in the course. This type of information enables course designers to alter courses as necessary to maintain a favorable reputation.

A Cyclical Model of Motivational Constructs in Web-Based Courses

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A Cyclical Model of Motivational Constructs in Web-Based Courses

1. Introduction

Motivation to learn reflects a trainee's desire to learn the content of a training program and is a central construct in training theory and research (Noe, 1986). Theory suggests, and research has confirmed, that individual differences and situational factors predict motivation to learn, and motivation to learn predicts knowledge acquisition, trainee reactions, and training transfer (e.g., Abedi & O'Neil, 2005; Cannon-Bowers, Salas, Tannenbaum, & Mathieu, 1995; Clark, 2005; Colquitt, LePine, & Noe, 2000; Sitzmann, Brown, Casper, Ely, & Zimmerman, 2008). Prior research offers a relatively clear picture of the importance of motivation to learn for training effectiveness—with motivation serving as a key mediator between individual and situational characteristics and training outcomes. However, several questions remain. First, does motivation to learn remain stable, increase, or decrease across multiple courses? An answer to this question will provide insight as to whether motivational processes are independent across courses or whether there are carryover effects across courses in a curriculum.

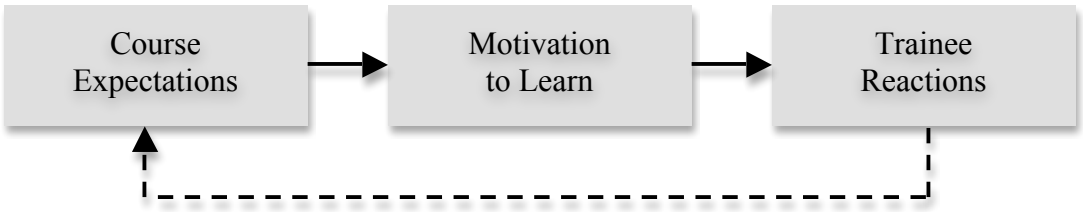
Second, what are the antecedents and outcomes of motivation to learn at the within-person level of analysis? Previous research has examined antecedents and outcomes of motivation to learn within the confines of a single course (e.g., Mathieu, Tannenbaum, & Salas, 1992; Noe & Schmitt, 1986). However, military training is often delivered as a sequence of courses, either within a curriculum or within a career path. Longitudinal research is needed to understand whether antecedents and outcomes of motivation to learn covary across courses within a training curriculum. Specifically, do course expectations predict intraindividual changes in motivation to learn? Does motivation to learn predict intraindividual changes in trainee reactions and learning?

The goal of this research was to address these questions by examining changes in motivation to learn across nine Web-based courses in a military training curriculum. A cyclical model of motivation is proposed in which trainees' course expectations predict motivation to learn and motivation to learn predicts trainee reactions and learning. The unique contribution of this model is its focus on relationships among multiple motivational constructs in order to test the dynamic interplay among motivational constructs across training courses (e.g., trainee reactions are proposed as an antecedent of expectations for future training courses). The following section discusses the relationships between course expectations, motivation to learn, trainee reactions, and learning.

The majority of research on motivation to learn has been conducted within the confines of a single training course. However, military courses frequently do not occur in isolation. The U.S. Department of Defense represents a substantial training and education enterprise. Beyond instruction for the 1.4 million active duty personnel, training and educational services are continually provided to 870,000 ready reservists, more than 750,000 civilian personnel, and 110,000 military dependents in K-12 schooling (Wisher, 2006). Billions of dollars are invested each year to train and educate servicemembers—with thousands of courses for hundreds of specialized occupational areas.

The immediate goal of individual military training is to qualify personnel to perform competently as members of operational military units. Servicemembers progress from recruit training to formal specialized skill training at technical schools. This training provides initial job qualification skills (e.g., occupational skills for combat engineers). Progression through the career field requires additional training courses at higher skill levels. Additionally, there is mandatory annual training on topics such as information assurance, prevention of sexual harassment, and force protection. In these situations, motivation to learn should be conceptualized from a systems perspective, recognizing possible carryover effects from one course to the next. This is consistent with Baldwin and Magjuka's (1997) perspective that every training experience can be categorized as a training episode. From a trainee's perspective, all parts of the episode—beginning when the trainee first learns about training until the trainee returns to the work situation—are evaluated based on previous training experiences. The following discussion outlines the foundation of a cyclical model of motivation to learn in which trainees' course expectations predict motivation to learn, motivation to learn predicts trainee reactions and learning, and trainee reactions predict subsequent course expectations (see Figure 1).

Figure 1
A cyclical model of motivation to learn



1.1 Effect of Course Expectations on Motivation to Learn

Course expectations reflect individuals' beliefs about the quality and job relevance of an upcoming training experience and are formed based on prior experience and information received about the course. Previous research suggests that course expectations influence motivation to learn at the between-persons level of analysis. A similar effect should occur at the within-person level of analysis. Facteau, Dobbins, Russell, Ladd, and Kudisch (1995) studied 967 supervisors and managers and found course expectations correlated .61 with motivation to learn. Similarly, Switzer, Nagy, and Mullins (2005) found course expectations correlated .27 with motivation to learn among 93 managers participating in leadership training. These results suggest trainees' expectations about an upcoming training program can have a strong influence on their motivation to learn. Trainees are more motivated to learn when they have favorable expectations than when they have less favorable expectations.

Hypothesis 1. Across training courses, course expectations will have a positive effect on motivation to learn.

1.2 Effect of Motivation to Learn on Trainee Reactions and Learning

Affect research (e.g., Weiss & Cropanzano, 1996) suggests pretraining motivation should have a positive effect on trainee reactions. Trainee reactions reflect trainees' satisfaction with their instructional experience (Sitzmann et al., 2008). Given that motivation to learn influences enthusiasm for learning (Noe & Schmitt, 1986), trainees should exhibit greater interest in learning and enjoy learning more when they are motivated (Ainley, Hidi, & Berndorff, 2002; Weiss & Cropanzano, 1996). This in turn leads to higher satisfaction and more favorable trainee reactions. Previous research has consistently suggested motivation to learn is an antecedent of trainee reactions at the between-persons level of analysis (e.g., Sitzmann et al., 2008; Tracey, Hinkin, Tannenbaum, & Mathieu, 2001). It is hypothesized that motivation to learn will also predict reactions at the within-person level of analysis.

Hypothesis 2. Across training courses, motivation to learn will have a positive effect on trainee reactions.

Researchers have also consistently demonstrated motivation to learn has a positive effect on learning outcomes (e.g., Mathieu et al., 1992; Randel, Main, Seymour, & Morris, 1992; Zazanis, Zaccaro, & Kilcullen, 2001). Colquitt et al. (2000) reported motivation to learn has a strong effect on training transfer ($\rho = .58$) and moderate effects on declarative knowledge ($\rho = .27$) and skill acquisition ($\rho = .16$). Because motivation to learn is an important precursor to learning at the between-persons level, it should exhibit a similar effect at the within-person level of analysis.

Hypothesis 3. Across training courses, motivation to learn will have a positive effect on learning.

1.3 Effect of Trainee Reactions on Subsequent Course Expectations

As noted earlier, military training courses do not occur in isolation. In fact, a breadth of training content is available trainees who repeatedly update their work-related knowledge and skills. Moreover, the U.S. Army encourages all servicemembers to develop a lifelong learning approach and to continuously participate in training throughout their careers. It is intuitive that positive or negative experiences in one training course will influence expectations about subsequent courses, especially when the conditions of training (e.g., delivery media, instructor, training location) are similar across courses. For example, trainees who have positive reactions to an instructor are likely to believe subsequent courses taught by the same instructor will be pleasant; trainees who found one Web-based course was difficult to navigate are likely to have negative expectations about subsequent Web-based courses. This is consistent with the attitudes literature that suggests that experiences influence subsequent attitudes (e.g., individuals who have had negative experiences with computers also have negative attitudes toward computers; Gardner, Dukes, & Discenza, 1993). Therefore, trainee reactions to a course likely predict expectations for subsequent courses.

Hypothesis 4. Across training courses, trainee reactions will have a positive effect on expectations for subsequent courses.

2. Method

2.1 Occupational Training Program

Trainees participated in an occupational training program designed to prepare them for civilian positions in the military. After successfully completing the training program, trainees were assigned to positions at military installations worldwide. In cohorts of 25 to 30, trainees completed 30 courses, 10 of which were taught online. The courses covered a variety of topics including workplace safety protocols, handling hazardous material, and military regulations. The online courses were completed in the first six months of the program and lasted an average of five to six days. Trainees sat at individual workstations and completed courses at their own pace in a computer lab with an instructor and other members of their cohort present.

Nine of the 10 online courses were evaluated in this research.[1] The courses all had a similar format—online text and figures were supplemented with readings. Each course included multiple modules, and trainees were allowed to review the modules in any order and as often as desired. At the conclusion of each module, trainees could answer a series of multiple-choice practice questions and receive feedback on their performance. At the end of each course, an instructor led a review session before the trainees completed the posttest. The instructors differed across courses, as well as across cohorts.

2.2 Participants

Participants were 103 trainees in four cohorts participating in a year-long occupational training program. Seventy-six percent were male, 65% were Caucasian, and the average age of trainees was 35.11 years (SD = 8.89).

2.3 Measures

Trainees completed demographics measures at the beginning of the training program. They also completed measures of course expectations and motivation to learn at the beginning of each course and trainee reactions and learning at the end of each course.

2.3.1 Course Expectations

A 14-item measure of course expectations was used to assess trainees' beliefs about whether the course would be enjoyable, useful, and whether they would have difficulty using the course technology. Sample items include, "I anticipate this course will be enjoyable," and "I anticipate the technology interface will be effective for conveying the course material." The reliabilities for this measure ranged from .84 to .92 across the nine courses.

[1] One course was dropped because some instructors failed to distribute the measures, leading to a low response rate.

2.3.2 Motivation to Learn

Motivation to learn was assessed with a 5-item measure adapted from Noe and Schmitt (1986). Sample items include, "I will try to learn as much as I can from this training course," and "I am motivated to learn the skills emphasized in the training program." The reliabilities for this measure ranged from .73 to .90 across the nine courses.

2.3.3 Trainee Reactions

Affective, utility, delivery, and technology reactions were assessed with 22 items. Sample items include, "This course was fun to complete," "I found the information in the training personally useful," and "The technology interface was difficult to use." Brown (2005) established that there is a high correlation among dimensions of reactions and advocated for an overall satisfaction measure. Based on Brown's findings, the four dimensions of reactions were averaged together. The reliabilities for this measure ranged from .72 to .96 across the nine courses.

2.3.4 Learning

Learning was assessed with 20 to 25 multiple-choice, fill in the blank, and short answer questions designed to assess declarative knowledge related to course learning objectives. Tests were created by subject matter experts and were piloted and revised by additional subject matter experts. Scores were recorded as the percentage of test questions answered correctly. In order to pass each course, trainees were required to earn at least an 80% on the corresponding exam and they were allowed to retake the test until they reached this level of proficiency. The scores used in this evaluation were from trainees' first attempts.

2.4 Data Analysis

Hierarchical linear modeling (HLM) with full maximum likelihood estimates was used to analyze the within-person results. Using the model building procedure specified by Singer and Willett (2003, a series of models were run to analyze changes in the dependent variables (i.e., motivation, reactions, learning, and course expectations) across the nine courses. For each outcome variable, the unconditional means (null) model was run to examine the variance in the outcome before accounting for any predictors. The unconditional means model allows for the calculation of an intraclass correlation coefficient (ICC). The ICC can be used to examine whether significant within- and between-person variance exists in the outcomes before running additional models. Next, the unconditional growth model was created by adding the order of the training courses as a covariate in all of the analyses, since time dependent analyses can be sensitive to order effects (Vancouver & Kendall, 2006). This predictor will be labeled *course* when reporting the results. Course was centered such that the intercept represents scores for course one.

After running the unconditional growth model for each outcome variable, the level-1 predictor variable was added to the model. There is disagreement regarding the effectiveness of hypothesis tests for fixed and random effects in HLM so statisticians generally prefer to use the deviance statistic to decide whether to accept a simpler or more complex model (Singer & Willett, 2003).

Deviance statistics, rather than the statistical significance of parameters, were used when deciding whether to retain a variable in a model and interpret a parameter. Deviance statistics can be compared for two models estimated with full maximum likelihood based on identical data in which one model (reduced model) is nested within the other (full model). The difference between the deviance statistics for the reduced and full models is chi-square distributed with degrees of freedom equal to the number of constraints imposed by the reduced model. Variables were retained in the model and the parameters were interpreted if the model fit significantly improved.

3. Results

Table 1 includes the descriptive statistics and within- and between-person correlations for the measures. Course expectations, motivation to learn, and trainee reactions were all strongly correlated at the within- and between-person levels, suggesting expectations, motivation, and reactions covary across courses.

Table 1
Descriptive Statistics and Correlations among Variables at the Within- and Between-Person Levels of Analysis

Variable	*M*	*SD*	1	2	3	4
1. Course expectations	3.89	0.38	-	.52*	.44*	.01
2. Motivation to learn	4.43	0.35	.58*	-	.25*	.07
3. Trainee reactions	3.89	0.38	.76*	.45*	-	.03
4. Learning	95.33	2.82	.22	.00	.07	-

Note. Between-persons correlations are below the diagonal while within-person correlations are above the diagonal. Due to missing data, the sample size for the between-persons correlations ranged from 66 to 103 and the sample size for the within-person correlations ranged from 224 to 384. * $p < .05$

Table 2 presents the results of the HLM analyses for Hypotheses 1 through 4. The first set of analyses tested Hypothesis 1, course expectations will have a positive effect on motivation to learn across courses. The ICC for motivation to learn was .40 ($\sigma_\epsilon^2 = 0.13$ and $\sigma_0^2 = 0.09$, $p < .05$). This indicates that 60% of the variance in motivation was at the within-person level while 40% of the variance was at the between-persons level. In addition, there was significant within- and between-person variability. Course ($\chi^2_{dif} = 18.40$, $p < .05$) and course expectations ($\chi^2_{dif} = 159.54$, $p < .05$) significantly improved the prediction of motivation to learn. In the final model, the course fixed effect was -0.04, indicating motivation decreased by 0.04 points per course. Motivation to learn was 0.30 points lower for the ninth than for the first course. The course expectations fixed effect was 0.54, indicating that for every 1-point increase in course expectations, motivation to learn was 0.54 points higher. Overall, these results support Hypothesis 1.

The second set of analyses tested Hypothesis 2, motivation to learn has a positive effect on trainee reactions across courses. The ICC for trainee reactions was .34 ($\sigma_\epsilon^2 = 0.15$ and $\sigma_0^2 = 0.08$, $p < .05$). This indicates that 66% of the variance in trainee reactions was at the within-person

level while 34% of the variance was between-persons. Adding course to the model did not significantly improve model fit ($\chi^2_{dif} = 2.67$, $p > .05$), indicating trainee reactions did not change in a systematic manner across the nine courses. However adding motivation to learn did improve model fit ($\chi^2_{dif} = 71.25$, $p < .05$). The motivation to learn fixed effect was 0.31, indicating trainee reactions increased 0.31 points for every 1 point increase in motivation to learn. These results support Hypothesis 2.

Table 2
Level-1 HLM Results Predicting Motivation to Learn, Trainee Reactions, Learning, and Course Expectations

Parameter	Motivation to Learn		Trainee Reactions		Learning		Course Expectations	
Fixed Effects								
γ_{00}	Initial status	2.43* (0.18)	Initial status	2.50* (0.28)	Initial status	103.51* (3.53)	Initial status	2.46* (0.29)
γ_{10}	Course	-0.04* (0.01)	Motivation to learn	0.31* (0.07)	Course	-0.94* (0.17)	Course	0.03 (0.015)
γ_{20}	Course expectations	0.54* (0.04)			Motivation to learn	-1.06 (0.79)	Reactions to previous course	0.34* (0.08)
Random Effects								
σ_ϵ^2	Within-person	0.08* (0.01)	Within-person	0.14* (0.01)	Within-person	18.80* (2.81)	Within-person	0.10* (0.07)
σ_0^2	Initial status	1.01* (0.42)	Initial status	1.65 (0.94)	Initial status	28.79* (90.69)	Initial status	1.34 (0.858)
σ_1^2	Course	0.00 (0.00)	Motivation to learn	0.11 (0.05)	Course	0.60 (0.340)	Course	0.00 (0.00)
σ_2^2	Course expectations	0.04 (0.02)			Motivation to learn	0.99* (4.38)	Reactions to previous course	0.17* (0.06)
Deviance Statistic		253.86		368.40		1205.79		203.06
df		10		6		10		10

Note. The top number is the fixed or random effect coefficient. The number in parentheses is the standard error. * $p < .05$

The next set of analyses tested Hypothesis 3, motivation to learn has a positive effect on learning across courses. The ICC for learning was .16 ($\sigma_\epsilon^2 = 21.71$ and $\sigma_0^2 = 4.25$, $p < .05$). This indicates that 84% of the variance in learning was at the within-person level while 16% of the variance was at the between-persons level. Both course ($\chi^2_{dif} = 25.04$, $p < .05$) and motivation to learn ($\chi^2_{dif} = 1390.98$, $p < .05$) significantly improved the prediction of learning. The course fixed effect was -0.94, indicating tests scores decreased by 0.94 percentage points per course for a total of 7.53 percentage points across the nine courses. The motivation to learn fixed effect was -1.06 and in the opposite direction of Hypothesis 3. This indicates across the nine courses, for every 1-point increase in motivation to learn, test scores were 1.06 percentage points lower. However, the motivation to learn fixed effect was 0.48 when course was not included in the model. This suggests that motivation has a positive effect on learning, but the effect size is negative when controlling for decreases in test scores across time. This is similar to a suppression effect in regression. Overall, these results fail to support Hypothesis 3.

Hypothesis 4 predicts that across courses, trainee reactions will have a positive effect on subsequent course expectations. The ICC for course expectations was .41, indicating that 59% of the variance in course expectations was at the within-person level while 41% of the variance was at the between-persons level ($\sigma_\epsilon^2 = .134$ & $\sigma_0^2 = .094$, $p < .05$). Both course ($\chi^2_{dif} = 11.57$, $p < .05$) and trainee reactions ($\chi^2_{dif} = 166.51$, $p < .05$) significantly improved the prediction of course expectations. The course fixed effect was .03 indicating course expectations were .23 points lower at the end than at the beginning of the training curriculum. In addition, the trainee reactions fixed effect was 0.34, indicating for every 1-point increase in trainee reactions, course expectations were 0.34 points higher. These results support Hypothesis 4.

4. Discussion

The purpose of this research was to investigate antecedents and outcomes of motivation to learn across courses in a military training curriculum. The analyses examined the stability of trainees' motivation to learn and the relationship among multiple motivational constructs across nine online courses. Overall, these results suggest there is a dynamic interplay among motivational constructs across training courses. The model begins with course expectations. When trainees have positive expectations, they are more motivated to learn the material. This is consistent with expectancy theory that suggests trainees consider the utility of training when deciding how much effort to expend to learn the material (Vroom, 1964) and highlights the value of expectations in understanding motivational processes. Course expectations color motivational processes, suggesting it is critical to maintain a favorable course reputation to ensure trainees are willing to exert the effort necessary to learn from training (Facteau et al., 1995; Switzer et al., 2005).

In turn, motivation to learn predicts changes in trainee reactions, and trainee reactions predict expectations for subsequent courses in the curriculum. Trainees who are motivated to learn the course material leave the course with more favorable perceptions of the course. Favorable perceptions translate into positive expectations regarding subsequent courses. This highlights the value of considering the training context when evaluating training courses and approaching motivation to learn from a systems perspective (Baldwin & Magjuka, 1997). Training courses do not occur in isolation and negative experiences in one course can have a detrimental effect on subsequent motivation to learn. Therefore, it is critical that organizations invest time and resources in all training courses because one negative experience can have negative effects on motivational processes in subsequent courses.

Perhaps more surprising was the fact that both motivation to learn and learning decreased across courses in the training curriculum investigated in this research. One explanation for this effect may be the design of the training courses. The courses in this research had similar designs, were primarily text-based, and their format was akin to many Web-based training courses. Trainees read several screens of text, answered multiple-choice questions based on the text, and moved on to another section once they correctly responded to the questions. Encouraging active engagement with the material and incorporating a wide variety of instructional methods may have resulted in trainees remaining motivated across courses in the curriculum. To be actively involved, trainees must engage in higher-order thinking tasks such as analysis, synthesis, and evaluation (Bonwell & Eison, 1991). Previous research indicates active approaches to learning

have a positive effect on motivation, learning, and utility reactions (Hake, 1998; Prince, 2004; Wingfield & Black, 2005). Additionally, research suggests that to maximize learning from online instruction, courses should incorporate a variety of instructional methods so trainees who are having difficulty learning the course content can review with a variety of methods until they have mastered the material (Sitzmann, Kraiger, Stewart, & Wisher, 2006). Future research should examine the effect of instructional methods on changes in motivation and learning across courses.

Another possible explanation for the reduction in motivation and learning may be the 80% cutoff for passing set by the organization. After the first few exams, trainees may have reduced their subsequent effort in order to merely accomplish this goal. Prior research supports the idea that motivational processes can be negatively related to performance when high self-efficacy translates into reduced effort (Vancouver & Kendall, 2006). Providing incentives for surpassing minimum performance standards may have helped maintain motivation and altered the observed relationship between motivation and learning.

4.1 Recommendations for Practitioners

These results have important implications for military training courses. First, they suggest that a training course's reputation predicts how motivated a trainee will be to learn the training material. Regardless of the quality of instruction, trainees may not be as motivated if they believe the training program will not be enjoyable or relevant to their jobs. Therefore, it is critical that organizations actively collect trainee reactions in an effort to monitor their courses' reputations. By soliciting feedback from trainees, the military can better understand which material trainees found useful and difficulties they encountered in the course. This type of information enables course designers to alter courses as necessary to maintain a favorable reputation.

Second, as motivational processes are cyclical, having more motivated trainees will result in more favorable reactions to training. Favorable reactions will then lead to positive expectations about future training courses. In times of peace, military personnel spend the majority of their time in training (Salas, Milham, & Bowers, 2003), and training quality can have a large impact on the reputation of an organization (Clardy, 2005). Through its effect on the military's reputation, having high-quality training programs can reduce the cost of recruiting and retaining servicemembers (Clardy). One example of how the military has benefited from positive publicity regarding their training programs is a Discovery channel documentary on Navy SEALs training (Clardy). The SEALs have a rigorous training program to indoctrinate the standards that define the ethos of the SEALs. The positive reputation of SEALs training may be one reason the Navy SEALs are coveted positions in the military.

Third, organizations should encourage trainees to perform at a high level at all times. In this evaluation, having an 80% minimum standard for test performance and not rewarding trainees who far exceeded this standard may have encouraged trainees to reduce their level of effort as they progressed through the courses. This could explain why motivation to learn and learning decreased over time. Rewarding high performers may have negated this effect.

4.2 Limitations and Directions for Future Research

There are several limitations to this research. First, there are missing data because some trainees did not complete all of the measures and the organization did not provide test scores for all trainees in every course. Missing data is one of the main challenges of a longitudinal field research, but these results are useful because they capture real-world training of working adults. In addition, trainees in this research, on average, were older (average age was 35 years) than traditional military trainees. More research is needed to examine how missing data and the age of trainees may have influenced these results.

Second, range restriction in test scores may have attenuated observed correlations. The mean learning score across exams was 95.33 (*SD* = 2.82). In addition, including changes across courses as a predictor in the model resulted in motivation to learn having a negative effect on learning—akin to a suppression effect in regression. Further research is needed to understand the effect of motivation to learn on learning at the within-person level of analysis.

4.3 Conclusion

These results support a dynamic interplay between course expectations, motivation to learn, and trainee reactions across courses in a training curriculum. The cyclical model begins with course expectations, which have a positive effect on motivation to learn. Across courses in a curriculum, motivation to learn then has a positive effect on trainee reactions, and trainee reactions have a positive effect on course expectations. These results highlight the value of maintaining a positive training reputation and developing courses that trainees find useful and enjoyable. Positive course experiences increase the likelihood that trainees will be motivated and have favorable reactions to subsequent courses in the curriculum.

5. References

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